

Claims:

1. A method of separating multivalent ions and lactate ions from a fermentation broth comprising a multivalent ion lactate salt by using an electrodialysis or electrolysis apparatus, comprising the steps of introducing the broth wherein the multivalent ion concentration is at least 0.1 mole/l, the lactate ion concentration is less than 300 g/l, and less than 10 mole% of the lactate ion are other negatively charged ions, into a first compartment of the electrodialysis or electrolysis apparatus, which compartment is limited by an anion-selective or non-selective membrane and a cathode, and wherein the multivalent ion is converted to obtain a residual stream comprising the hydroxide of the multivalent ion, and the lactate ion is transported through the anion-selective or non-selective membrane into a second compartment limited by the anion-selective or non-selective membrane and an anode, after which the lactate ion is neutralized to lactic acid.
2. The method according to claim 1 wherein the broth contains per equivalent of lactate ion at least 0.1 equivalent of the multivalent ion, and preferably at least 0.3 equivalents of the multivalent ion.
3. The method according to claims 1 or 2 wherein the multivalent ion concentration in the broth is 0.1 – 1.5 mole/l.
4. The method according to any one of claims 1-3 wherein the multivalent ion is a multivalent metal ion selected from magnesium, calcium, zinc, iron, aluminum, and mixtures thereof.
5. The method according to any one of claims 1-4 wherein the fermentation broth comprises microorganisms.
6. The method according to any one of claims 1-5 wherein the residual stream is recycled to the fermentation broth.
7. The method according to claim 6 wherein the hydroxide of the multivalent ion is at least partially present as solid in slurry.
8. The method according to any one of claims 1-7 wherein the lactic acid is recycled to the first compartment.
9. The method according to any one of the previous claims wherein the membrane is an anion-selective membrane.
10. The method according to any one the previous claims wherein a second membrane is used within the first compartment being an anion-selective membrane, a non-selective membrane, or a bipolar membrane having its cation-selective side directed to the cathode.

11. The method according to any one of the previous claims wherein within the first compartment alternating anion-selective or non-selective membranes and bipolar membranes are used having their cation-selective sides directed to the cathode.
- 5 12. An electrodialysis or electrolysis apparatus for separating a fermentation broth into a residual stream comprising multivalent ions and lactate ions, comprising a first compartment which is limited by an anion-selective or non-selective membrane, preferably an anion-selective membrane, and a cathode, which further comprises means for introducing the fermentation broth, and a second compartment limited by the anion-selective or non-selective membrane and an anode, which further
10 comprises means for removing lactic acid, and optionally means to recycle the residual stream to the fermentation broth.
13. The electrodialysis or electrolysis apparatus of claim 12 wherein the first compartment further comprises a second membrane being an anion-selective membrane, a non-selective membrane, or a bipolar membrane having its cation-selective side directed
15 to the cathode.
14. The electrodialysis or electrolysis apparatus of claim 12 or 13 wherein the first compartment comprises alternating anion-selective or non-selective membranes and bipolar membranes having their cation-selective sides directed to the cathode.